

DOCKET NO: 292187US0PCT

IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF :  
KLAUS BOHMHAMMEL, ET AL. : EXAMINER: NGUYEN, N. Y. M.  
SERIAL NO: 10/586,369 :  
FILED: JULY 18, 2006 : GROUP ART UNIT: 1734  
FOR: METHOD FOR THE PRODUCTION :  
OF HSICL<sub>3</sub> BY CATALYTIC  
HYDRODEHALOGENATION OF SICL<sub>4</sub>

APPEAL BRIEF UNDER 37 C.F.R. § 41.37

COMMISSIONER FOR PATENTS  
ALEXANDRIA, VIRGINIA 22313

SIR:

Responsive to the Final Office Action of July 23, 2010 and the Advisory Action of November 2, 2010, and further to the Notice of Appeal filed on November 2, 2010, Appellants request the Board of Patent Appeals and Interferences REVERSE the rejection of the claims.

I. REAL PARTY IN INTEREST

The real party in interest is Evonik Degussa GmbH of Germany.

II. RELATED APPEALS AND INTERFERENCES

None.

### III. STATUS OF THE CLAIMS

Claims 1-17, 19-23 and 26-33 are pending in the present application. All of the pending claims stand rejected. The rejection of all pending claims is appealed.

### IV. STATUS OF THE AMENDMENTS

The Request for Reconsideration filed on October 25, 2010 was entered and considered. The Amendment filed on May 4, 2010 was entered and considered.

### V. SUMMARY OF THE CLAIMED SUBJECT MATTER

Claim 1 is an independent claim drawn to a process for the catalytic hydrodehalogenation of  $\text{SiCl}_4$  to form  $\text{HSiCl}_3$ . The process is generally described on page 2, lines 5-10. The process includes a step in which a gaseous feed mixture comprising hydrogen and silicon tetrachloride is brought into contact with a heating element (page 3, lines 5-9). The heating element is described on page 3, lines 11-14. The process includes a step of heating the gaseous feed mixture by contact with the heating element to thereby catalytically hydrodehalogenate silicon tetrachloride and form a product mixture that includes  $\text{HSiCl}_3$ . This aspect of the invention is described on page 4, lines 1-14. Subsequent to the heating the product mixture is either fractionated or condensed, or used directly as a starting material. This aspect of the invention is described on page 6, lines 1-9.

Claim 2 recites a heating element made from tungsten. A tungsten heating element is described on page 2, lines 12-15, page 3, lines 11-14 and page 5, lines 17-20.

Claim 3 recites heating with a heating element of a particular form or shape. The heating element is described in Example 1 in the paragraph bridging pages 6 and 7 and page 3, lines 16-22.

Claim 4 recites heating with a heating element in the form of a wire. The wire heating element is described in Example 1 on pages 6-7 and on page 3, lines 16-26.

Claim 5 recites heating with resistive heating at a temperature of 300-1,250°C. The heating is described on page 4, lines 12-14.

Claim 6 recites heating at a particular temperature and pressure condition. The heating temperature is described on page 4, lines 12-14 and the pressure is described on page 4, lines 16-19.

Claim 7 recites heating at a particular space velocity and linear velocity of a gaseous feed mixture. This aspect of the invention is described on page 4, line 21 through page 5, line 2.

Claim 8 further recites the gaseous feed mixture in terms of a molar ratio. This aspect of the claims is described on page 5, lines 4-6.

Claim 9 recites the inclusion of a step in which electric power of a heating device is set to a degree of conversion of  $\text{SiCl}_4$  to  $\text{HSiCl}_3$ . This aspect of the claims is described on page 5, lines 12-15.

Claim 10 recites heating in a particular flow reactor. The flow reactor is described on page 5, lines 17-20.

Claim 11 recites an additional process step of passing the product mixture through a heat exchanger. This aspect of the claims is described on page 5, lines 22-28.

Claim 12 recites a process in which a product mixture is at least partially condensed and in which other materials are recirculated to the process. This aspect of the claims is described on page 6, lines 1-9.

Claim 13 recites a heating element made from a particular metal described on page 3, lines 11-14.

Claim 14 recites a heating element made from a metal described on page 3, lines 11-14.

Claim 15 recites a heating element made from an alloy described on page 3, lines 11-14.

Claim 16 recites a heating element made from an alloy described on page 3, lines 11-14.

Claim 17 recites a heating element made from an alloy described on page 3, lines 11-14.

Claim 18 is a canceled claim.

Claim 19 recites particular pressure conditions for contacting the gaseous feed mixture with a heating element. The pressure conditions are described on page 4, lines 16-19.

Claim 20 recites carrying out heating of a gaseous feed mixture with a heating element at a particular pressure condition. The particular pressure condition is described on page 4, lines 16-19.

Claim 21 recites a heating element that consists of a metal material. This aspect of the claims is described in Example 1 on pages 6-7.

Claim 22 recites a heating element described on page 3, lines 11-14.

Claim 23 recites a heating step having a particular temperature and pressure condition in combination with a step of fractionating or condensing a product mixture. This aspect of the claims is described in the original claims and on page 4, lines 16-19 and page 6, lines 1-9.

Claim 24 is a canceled claim.

Claim 25 is a canceled claim.

Claim 26 recites a fractionating step described on page 6, lines 1-9.

Claim 27 recites a product mixture described on page 6, lines 11-15 and in Example 1.

Claim 28 recites a product mixture of particular composition which is treated by fractionation or at least partial condensation. This aspect of the claims is described on page 6, lines 11-15 and on page 6, lines 1-9.

Claim 29 recites a product mixture. This aspect of the claims is described in Example 1 on pages 6-7.

Claim 30 recites a heating element made from a particular metal. This aspect of the claims is described on page 3, lines 11-14.

Claim 31 recites contacting the gaseous feed mixture with a heating element at a particular temperature. This aspect of the invention is described in Example 1 on pages 6-7 and on page 4, lines 16-19.

Claim 32 is an independent claim drawn to a process for the catalytic hydrodehalogenation of  $\text{SiCl}_4$  to form  $\text{HSiCl}_3$ . The process is generally described on page 2, lines 5-10. The process includes a step in which a gaseous feed mixture comprising hydrogen and silicon tetrachloride fed into a reactor and is brought into contact with a heating element (page 3, lines 5-9). The heating element is described on page 3, lines 11-14. The process includes catalytically hydrodehalogenating silicon tetrachloride to form a product mixture that includes  $\text{HSiCl}_3$ . This aspect of the invention is described on page 4, lines 1-14. Subsequent to the heating the product mixture is either fractionated or condensed, or used directly as a starting material. This aspect of the invention is described on page 6, lines 1-9.

Claim 33 recites a heating element of particular composition. This aspect of the claims is described on page 3, lines 10-14.

## VI. GROUND OF REJECTION

(I) Claims 27 and 28 are rejected as failing to comply with the written description requirement under 35 U.S.C. § 112, first paragraph.

(II) Claims 1-17, 19-23 and 26-30 are rejected for indefiniteness under 35 U.S.C. § 112, second paragraph.

(III) Claims 1-3, 5, 14-15, 17, 21-22, 27 and 29-30 are rejected as anticipated by Yamanaka (U.S. 6,653,212) under 35 U.S.C. § 102(b).

(IV) Claims 1-11, 13-17, 19-23, 27 and 29-33 are rejected as obvious under the meaning 35 U.S.C. § 103(a) over Yamanaka in combination with DeLuca (U.S. 5,910,295) or Rodgers (U.S. 3,933,985).

(V) Claims 1-17, 19-23 and 26-30 are rejected as obvious under the meaning 35 U.S.C. § 103(a) over JP '017 (JP 57-118017) in combination with Yamanaka, Roewer (U.S. 5,716,590) and Rodgers.

## VII. ARGUMENT

**(I) The rejection of Claims 27 and 28 for failing to comply with the written description requirement should be withdrawn in view of page 6, lines 11-15 of the as-filed disclosure.**

Claims 27 and 28 describe a hydrodehalogenation process that forms a product mixture containing  $\text{HSiCl}_3$  and  $\text{HCl}$ . The disclosure of the use of reactor that is resistant to  $\text{HCl}$  in combination with the prevalent use of the word “hydrodehalogenation” throughout the as-filed disclosure is evidence from which those of skill in the art would understand that Appellants had possession of the subject matter of Claims 27 and 28 at the time the application was filed.

Hydrodehalogenation, by definition, includes the removal of a halogen atom from a material and its combination with a hydrogen atom. When this reaction is carried out a chlorine substituted material it necessarily forms a hydrogen halide. This interpretation of the word hydrodehalogenation is explicitly supported by the cited art. For example, Example 11 at column 7 of the Roewer reference describes hydrodechlorination of a halogenated material in the presence of hydrogen to form a product mixture that includes HCl.

Appellants thus submit that the as-filed disclosure includes a description of hydrodehalogenation sufficient for those of skill in the art to recognize that Appellants were in possession of the invention now described in Claims 27 and 28.

Appellants respectfully request reversal of the rejection.

**(II) The rejection of the claims for indefiniteness should be withdrawn because the recitation of additional steps in the claimed process does not make the claimed invention indefinite.**

The Examiner takes the position that the claims are indefinite for the reason that the preamble recites a process for the catalytic dehydrogenation of  $\text{SiCl}_4$  to form  $\text{HSiCl}_3$  but the process may include a step whereby the thus-formed  $\text{HSiCl}_3$  is passed as a starting material to a further use (see page 3 of the July 23 Office Action).

Appellants submit the rejection makes no sense on its face. With regard to the question of definiteness it is immaterial whether the claimed process may include optional steps. Appellants point out that the claimed invention explicitly recites and requires the hydrodehalogenation of silicon tetrachloride with hydrogen to form  $\text{HSiCl}_3$ . Appellants respectfully submit that those of skill in the art would have no difficulty understanding the metes and bounds of the present claims.

Appellants thus respectfully request the Board reverse the rejection for indefiniteness.

**(III-A) The rejection of the claims as anticipated by Yamanaka should be withdrawn because Yamanaka uses hydrogen as an inert carrier gas not as a reactant.**

The Examiner incorrectly takes the position that it is an “inherent state of fact that  $\text{HSiCl}_3$  reacts with hydrogen to form Si” (see lines 2-3 of page 6 of the July 23, 2010 Office Action). In the context of the Yamanaka process hydrogen is explicitly characterized as an *inert* gas. The Examiner’s assertion of inherency cannot be correct because an inert gas does not react in the asserted manner.

Yamanaka describes hydrogen, for example, on column 48, lines 48-52:

The relationships between the formed metal thin films and the material gases (reaction gases) are as follows. Note that, as the carrier gas, preferably use is made of an **inert** gas such as He,  $\text{H}_2$ , Ar, or  $\text{N}_2$ .

The above-quoted disclosure makes it clear that with respect to the Yamanaka thin-film deposition process hydrogen gas is an inert material.

Yamanaka’s use of inert hydrogen gas as a carrier gas contrasts sharply with the claimed invention in which silicon tetrachloride is hydrodehalogenated with hydrogen to form  $\text{HSiCl}_3$ . This hydrodehalogenation reaction is described in the following chemical formula:



Hydrodehalogenation necessarily includes the reaction of hydrogen with silicon tetrachloride. Hydrogen is not inert in the above-described hydrodehalogenation reaction because hydrogen forms a new bond with the silicon atom of the silicon tetrachloride.

The Examiner’s rejection of the claims as anticipated by Yamanaka is factually not supportable because Yamanaka describes hydrogen as an inert carrier gas, i.e., a chemical that does not undergo reaction with a silicon-based reaction material in the Yamanaka process.



On page 6, lines 4-6 of the July 23 Office Action the Examiner appears to take the position that Yamanaka discloses only that hydrogen is *preferably* an inert gas. The Examiner's statement is shown below:

It should be noted that in Yamanaka '212, as carrier gas, "preferably use is made of an inert gas such as He, H<sub>2</sub>, Ar, or N<sub>2</sub>" (note column 48, lines 53-54), the "inert gas" is preferred but not a must.

The Examiner misses the point. Yamanaka does not disclose that hydrogen is preferably inert but instead describes a preferable group of inert gases.

Appellants thus respectfully request the Board reverse the rejection of the claims as anticipated by Yamanaka.

**(III-B) The rejection of the claims as anticipated by Yamanaka should further be withdrawn because the references cited to support the allegation of inherency describe different processes.**

The Examiner's reliance on the DeLuca and Rodgers references as evidence in support of the erroneous assertion of inherency is likewise not correct.

DeLuca describes a reaction that is different from the thin-film deposition process of Yamanaka. DeLuca describes a "redistribution" reaction of silicon tetrachloride, hydrogen and silica, not a hydrodehalogenation (see column 1, lines 10-35 of DeLuca). A redistribution reaction is not a hydrodehalogenation reaction because no HCl is formed (compare the net DeLuca reaction with the hydrodehalogenation reaction  $\text{SiCl}_4 + \text{H}_2 \rightarrow \text{HSiCl}_3 + \text{HCl}$ ).

The DeLuca reference cannot serve as evidence of inherency because DeLuca describes a different reaction. Where Yamanaka describes the decomposition of silicon tetrachloride to form silicon, DeLuca describes a reaction in which silicon tetrachloride, hydrogen and silica are reacted to make HSiCl<sub>3</sub>. Nowhere does DeLuca describe a reaction

in which silicon tetrachloride and hydrogen gas are combined in the manner of Yamanaka to form  $\text{HSiCl}_3$ .

The Examiner further erroneously relies on the Rodgers reference as evidence of inherency. Appellants again point out that the Rodgers process is substantially different from the Yamanaka process. In fact, where Yamanaka describes a process in which the *deposition* of silicon is the goal, the Rodgers reference describes a process in which the *deposition* and *formation of silicon is avoided*.

Rodgers discloses the following in this regard:

**Care must be taken in operation of the process in accordance with the invention to prevent deposition of silicon** within the reaction furnace since the silicon acts as a catalyst or nucleating agent in favor of reaction (1) rather than in favor of the formation of trichlorosilane (reaction 2), as is desired. To avoid formation of any silicon in the reaction furnace, it is therefore desirable that a minimum of 5% silicon tetrachloride be maintained in the feed to the reaction chamber, and as shall be shown, a preferred feed contains approximately 50% silicon tetrachloride.

See column 3, lines 32-37 of the Rodgers reference.

The contradictory nature of the Yamanaka and Rodgers processes proves that the Examiner's reliance on the DeLuca and Rodgers references to prove inherency is not supportable.

Claims 27 and 29 are further not anticipated by Yamanaka

Claim 27 describes a process in which the product mixture formed by the hydrodehalogenation comprises  $\text{HSiCl}_3$  and  $\text{HCl}$ . As argued above in detail, Yamanaka does not describe a hydrodehalogenation reaction in which  $\text{HCl}$  is formed.

Claim 27 should thus be found further patentable over Yamanaka.

Claim 29 describes a process in which a product mixture formed by hydrodehalogenation "consists of  $\text{HSiCl}_3$  formed by catalytically dehydrogenating" silicon

tetrachloride. Yamanaka cannot anticipate Claim 29 because the Yamanaka process necessarily forms silicon in the form of a thin-film.

The rejection of Claim 29 as anticipated by Yamanaka should likewise be reversed.

**(IV) The rejection of Claims 1-11, 13-17, 19-23, 27 and 29-33 as obvious over Yamanaka in combination with DeLuca and/or Rodgers should be withdrawn because the Examiner has not shown that the cited art suggests or discloses the hydrodehalogenation of  $\text{SiCl}_4$  with  $\text{H}_2$  to form  $\text{HSiCl}_3$ .**

The Examiner again erroneously asserted that Yamanaka describes a process which inherently includes hydrodehalogenation of tetrachlorosilane with hydrogen to form trichlorosilane (see page 7, lines 1-3 of the July 23 Office Action). Appellants submit that the rejection of the claims as obvious in view of Yamanaka, DeLuca and Rodgers should be withdrawn to the extent the Examiner erroneously relied on the incorrect assertion that Yamanaka inherently describes the hydrodehalogenation of the present claims.

Appellants submit that Yamanaka does not explicitly, implicitly or inherently describe a process in which silicon tetrachloride is hydrodehalogenated with hydrogen to form silicon trichloride.

Appellants thus respectfully request the Board reverse the rejection for obviousness.

Claim 7 is further not obvious over the cited art

Claim 7 recites a heating step which is carried out at a space velocity of 2,000-750,000  $\text{h}^{-1}$ . Appellants submit that those of ordinary skill in the art readily recognize that space velocity is a relative measure of the volumetric flow through a reactor of a particular volume. In particular, space velocity is a measure of the number of reactor volumes of a feed gas that can be fed through or reacted in a reactor in a given period of time. Claim 7 recites a minimum of 2,000 reactor volumes of the feed gas mixture per hour.

Appellants point out that the Yamanaka process is entirely different and is carried out under a vacuum condition that would not lend itself to optimization within the space velocity recited in Claim 7. Yamanaka makes it clear that the Yamanaka process is carried out in a vacuum chamber (see the Abstract of the Yamanaka reference). Nothing in the Yamanaka reference is suggestive of the space velocities recited in Claim 7.

Appellants thus submit that Claim 7 is further not obvious over Yamanaka and the other cited art.

Claims 19-20 recite pressure conditions that are not suggested by the cited art

Claims 19 and 20 describe processes in which a gaseous mixture is contacted with the heating element at a pressure of 1-10 bar. Appellants submit that the subject matter of Claims 19 and 20 is further patentable over the cited art for the reasons explained above; namely, Yamanaka describes a process which is carried out under vacuum conditions. A vacuum has a pressure condition of less than atmospheric pressure, i.e., less than 1 bar. Nothing in the Yamanaka reference is suggestive of carrying out a hydrodehalogenation reaction of silicon tetrachloride with hydrogen at pressures that are greater than ambient, e.g., at pressures that are 1 bar or greater.

Likewise, nothing in the DeLuca or Rodgers references is suggestive of a modification of the Yamanaka process such that silicon tetrachloride can be decomposed to form thin-films of silicon under process conditions at which the temperature is equal or greater than 1 bar.

Appellants thus submit that Claims 19 and 20 are further not obvious in view of the cited art.

Claim 12 requires an isolating step that is not suggested by Yamanaka

Claim 12 requires that the product mixture formed by the hydrodehalogenation of silicon tetrachloride to form  $\text{HSiCl}_3$  is at least partially condensed and liquid  $\text{HSiCl}_3$  is isolated. The subject matter of Claim 12 is contradictory to the Yamanaka disclosure and thus cannot be obvious in view of the cited art.

Yamanaka requires the formation of a thin-film of silicon. Carrying out the process of Yamanaka to isolate  $\text{HSiCl}_3$  would modify the Yamanaka process in a manner to make the Yamanaka process inoperable. If  $\text{HSiCl}_3$  were isolated in the Yamanaka process, under the Examiner's interpretation, no silicon would form because  $\text{HSiCl}_3$  is an intermediate in the formation of silicon material in the Yamanaka process.

For the purposes of argument only, if in fact DeLuca and/or Rodgers suggest or describe processes in which  $\text{HSiCl}_3$  is isolated in liquid form, such disclosure is insufficient to set forth a *prima facie* case of obviousness for Claim 12 at least for the reason that, as described above, modification of the Yamanaka process to isolate  $\text{HSiCl}_3$  would render the Yamanaka process to be inoperable, i.e., such a modification would interrupt and prevent the formation of silicon thin films which is the purpose of the Yamanaka process.

Appellants thus submit that Claim 12 is further not obvious in view of the cited art.

**(V) The rejection of the claims as obvious over JP '017 should be withdrawn because JP '017 requires the use of a heating element that is different from and not suggestive of the heating element of the present claims.**

The present claims recite heating a gaseous feed mixture by contact with a metal heating element. The process of the present claims is exclusive of the JP '017 process in which heating is carried out with a *graphite* heating element. The Examiner nonetheless erroneously asserts that those of skill in the art would modify the JP '017 process to use the metallic heating element of the Yamanaka process.

Appellants submit that the Examiner's assertion is not supportable in view of the contradictory nature of the JP '017 and Yamanaka processes; namely, graphite and metal are different.

In the alternate the Examiner erroneously asserts that the Roewer reference suggests modifying the JP '017 process to include heating with a metallic heating element. Appellants first point out that the Roewer process describes catalytic dehalogenation of a halogen-containing compound "using a finely-dispersed catalytically active material" (see the Roewer Abstract). The Roewer reference does not describe the use of a heating element but instead describes heating a reaction mixture that includes a halogen-containing compound in the presence of a finely-dispersed material that may contain a transition metal. In short Roewer does not describe the use of a metal heating element to effect heating of a mixture of silicon tetrachloride and hydrogen to form  $\text{HSiCl}_3$ .

Claims 3, 4, and 33 should be found further patentable over JP '017 and Roewer in view of the particular form of the heating element

Claim 33 recites a "metallic" heating element. JP '017 and Roewer do not describe any metallic heating element. Instead, Roewer describes a mixture that includes a catalytically active material that may include at least one transition metal. The catalytically active material of Roewer is not in metallic form but is instead a combination of silicon and the metal, e.g., in the form of a metal silicide (see column 1, line 63 - column 2, line 15 of Roewer). Examples of such material include  $\text{Ni}_2\text{Si}$ ,  $\text{Ni}_3\text{Si}_2$ ,  $\text{NiSi}$  or  $\text{NiSi}_2$  (see column 2, lines 25-27 of Roewer).

Appellants submit that those of skill in the art readily recognize that such complexes of a transition metal and silicon are not metallic. The catalytically active material of the Roewer reference is therefore not metallic and the combination of JP '017 and Roewer is insufficient to suggest the subject matter of Claim 33.

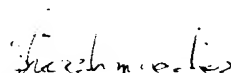
This is likewise the case with respect to Claims 3 and 4 of the present application. The particular form of material in present Claims 3 and 4 is exclusive of and not suggested by Roewer. Nowhere does Roewer disclose or suggest that the particular forms of heating element described in present Claims 3 and 4 may be used to effect the catalytic hydrodehalogenation of silicon tetrachloride to form  $\text{HSiCl}_3$ . Appellants thus submit that Claims 3 and 4 are further patentable over JP '017 and Roewer.

Appellants thus respectfully request the Board reverse the rejection of the claims as obvious over JP '017 in combination with the other cited art.

Appellants thus respectfully request the Board REVERSE the Examiner's rejections of the claims.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, L.L.P.



Richard L. Treanor  
Attorney of Record  
Registration No. 36,379

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 08/09)

Stefan U. Koschmieder, Ph.D.  
Registration No. 50,238

## VIII. CLAIMS APPENDIX

1. A process for the catalytic hydrodehalogenation of  $\text{SiCl}_4$  to form  $\text{HSiCl}_3$ , which comprises:

bringing a gaseous feed mixture comprising hydrogen and silicon tetrachloride into direct contact with at least one heating element of a resistance heating device, wherein the heating element is made from at least one metal material selected from the group consisting of tungsten, niobium, tantalum, an alloy comprising tungsten, an alloy comprising niobium, and an alloy comprising tantalum; and

heating the gaseous feed mixture by contacting the gaseous feed mixture with the heating element to catalytically hydrodehalogenate the silicon tetrachloride with the hydrogen and form a product mixture comprising  $\text{HSiCl}_3$ ; and

performing at least one of the following:

- (a) fractionating or at least partially condensing the product mixture, and
- (b) passing the product mixture from the heating as a starting material to a direct further use.

2. The process as claimed in claim 1,  
wherein said heating element is made from tungsten.

3. The process as claimed in claim 1,  
wherein the heating is carried out with at least one heating element in the form of at least one selected from the group consisting of a wire, a spiral, a web, a tube, a plate, a mesh and a honeycomb body.



4. The process as claimed in claim 1,  
wherein the heating is carried out with a heating element having a wire diameter, wall thickness, plate thickness or layer thickness of from 0.1 mm to 10 mm.

5. The process as claimed in claim 1,  
wherein the heating is carried out with the heating elements of the resistance heating device operated at a temperature in the range from 300 to 1250°C.

6. The process as claimed in claim 1,  
wherein the heating is carried out at a temperature in the range from 600 to 950°C and a pressure of from 0.1 to 100 bar abs.

7. The process as claimed in claim 1,  
wherein the heating is carried out at a space velocity of from 2000 to 750,000 h<sup>-1</sup> and the gaseous feed mixture is contacted with the heating elements of the resistance heating device at a linear velocity of from 0.01 to 10 m/s.

8. The process as claimed in claim 7,  
wherein the feed mixture comprises SiCl<sub>4</sub> and H<sub>2</sub> in a molar ratio of from 1:0.9 to 1:20.

9. The process as claimed in claim 7, further comprising:  
setting the electric power of the resistance heating device to set a degree of conversion of SiCl<sub>4</sub> to HSiCl<sub>3</sub>.

10. The process as claimed in claim 1,

wherein the heating is carried out in a flow reactor whose walls or wall insides are made from at least one selected from the group consisting of niobium, tungsten, tantalum, a niobium, tungsten, tantalum-containing alloy, a heat-resistant glass, fused silica, a heat-resistant glaze and a heat-resistant ceramic.

11. The process as claimed in claim 7,

further comprising:

passing the product mixture through at least one heat exchanger to vaporize  $\text{SiCl}_4$  and/or preheat the  $\text{H}_2/\text{SiCl}_4$ -containing feed mixture.

12. The process as claimed in claim 11,

wherein the product mixture is at least partially condensed, liquid  $\text{HSiCl}_3$  is isolated and any hydrogen and silicon tetrachloride obtained are recirculated to the feed stream to the process.

13. The process as claimed in claim 1, wherein said heating element is made from niobium.

14. The process as claimed in claim 1, wherein said heating element is made from tantalum.

15. The process as claimed in claim 1, wherein said heating element is made from an alloy comprising tungsten.

16. The process as claimed in claim 1, wherein said heating element is made from an alloy comprising niobium.

17. The process as claimed in claim 1, wherein said heating element is made from an alloy comprising tantalum.

19. The process of claim 1, wherein the gaseous feed mixture is contacted with the heating element and heated at a pressure of from 1 to 10 bar absolute.

20. The process of claim 1, wherein the gaseous feed mixture is contacted with the heating element and heated at a pressure of from 1.5 to 10 bar absolute.

21. The process of claim 1, wherein the heating element consists of the metal material.

22. The process of claim 1, wherein the heating element comprises the metal material.

23. The process of claim 1, wherein the process comprises heating the feed mixture at a temperature in the range from 600 to 950°C and a pressure of from 0.1 to 100 bar abs, and fractionating or at least partially condensing the product mixture.

26. The process as claimed in claim 1, comprising:  
fractionating or at least partially condensing the product mixture to obtain a purified product consisting of  $\text{HSiCl}_3$ .

27. The process as claimed in claim 1, wherein the product mixture formed by the catalytic hydrodehalogenation comprises  $\text{HSiCl}_3$  and  $\text{HCl}$ .

28. The process as claimed in claim 1, wherein the product mixture comprises  $\text{HCl}$  and  $\text{HSiCl}_3$ , and the product mixture is subjected to at least one of fractionating and at least partial condensation.

29. The process as claimed in claim 1, wherein the  $\text{HSiCl}_3$  of the product mixture consists of  $\text{HSiCl}_3$  formed by catalytically hydrodehalogenating the silicon tetrachloride.

30. The process as claimed in claim 1, wherein said heating element is made from tungsten or an alloy comprising tungsten.

31. The process as claimed in claim 1, wherein the gaseous feed mixture is contacted with the heating element at a temperature of 600-800°C.

32. A process for the catalytic hydrodehalogenation of  $\text{SiCl}_4$  to form  $\text{HSiCl}_3$ , comprising:

feeding a gaseous mixture consisting of hydrogen and silicon tetrachloride into a reactor,

contacting the gaseous feed mixture in the reactor with at least one heating element of a resistance heating device made from at least one metal material selected from the group consisting of tungsten, niobium, tantalum, an alloy comprising tungsten, an alloy comprising niobium, and an alloy comprising tantalum; and

catalytically hydrodehalogenating the silicon tetrachloride with the hydrogen to form a product mixture comprising  $\text{HSiCl}_3$ ; and then

carrying out at least one of (A) and (B):

(A) at least one of fractionating and at least partially condensing the product mixture, and

(B) passing the product mixture obtained from the heating to a further process as a starting material.

33. The process as claimed in claim 1, wherein the heating element is metallic.

IX. EVIDENCE APPENDIX

None.

X. RELATED OPINION APPENDIX

None.